

cont'd  
a7 wherein said first sensor is provided at said ink well in such a manner as to detect pressure waves propagating in ink in said ink well caused by a firing of said ink expulsion mechanism.

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a8 10 (amended). A print head apparatus, comprising:  
a substrate;  
an ink expulsion mechanism formed on said substrate;  
a cover plate spaced from said ink expulsion mechanism and having a nozzle formed therein, said nozzle being aligned with said ink expulsion mechanism; and  
a sensor mechanism formed on said substrate that is capable of detecting signals indicative of when said nozzle is clogged.

11 (amended). The apparatus of claim 10, wherein said sensor mechanism is capable of detecting signals indicative of when said nozzle is unclogged.

12 (amended). The apparatus of claim 10, wherein said sensor mechanism is capable of detecting signals indicative of one or more of the group of conditions including dry-fire and no-fire conditions.

13 (amended). The apparatus of claim 10, wherein said sensor is a pressure wave sensor.

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a9 16 (amended). The apparatus of claim 10, further comprising logic coupled to said sensor mechanism that is capable of determining a magnitude and timing of a pressure wave generated by a firing of said ink expulsion mechanism.

17 (amended). A method of monitoring performance of a print head, comprising the steps of:

attempting expulsion of a volume of ink through a nozzle of a print head;

Cont'd  
a<sup>9</sup>  
detecting within said print head a firing quality related characteristic of a resultant pressure wave generated by said attempt to expel said volume of ink through said nozzle.

18 (amended). The method of claim 17, further comprising the step of determining from said detected characteristic a status of said attempted expulsion of said volume of ink.

19 (amended). The method of claim 17, wherein said detecting step includes the step of detecting the presence or absence of a resultant pressure wave.

[Please add the following new claim:

a<sup>10</sup>  
28 (new). A method of monitoring performance of a print head, comprising the steps of:

attempting expulsion of a volume of ink from a print head;

detecting within said print head a magnitude and timing of a resultant pressure wave generated by said attempt to expel said volume of ink.

#### REMARKS

The above Amendments and these Remarks are in response to the Office Action mailed March 1, 2001. Claims 1-27 remain in the case. Claim 28 is added herein. Claims 23-27 are allowed and claims 6-7, 9, 15-16 and 20-22 are objected to as being dependent from rejected base claims.

Separate, marked-up versions of the paragraphs and claims that have been amended herein are attached.

The informalities in the claims helpfully pointed out by the Examiner on page 2 of the Office Action are addressed herein.

Claims 1-3 were rejected under 35 USC §102(b) as being anticipated by Isayama. While Isayama discloses a piezo-electric transducer, this transducer is used for ink expulsion, not sensing pressure waves. Claim 1 recites: